Operations and Flight Manual

UFM – 13 LAMBADA

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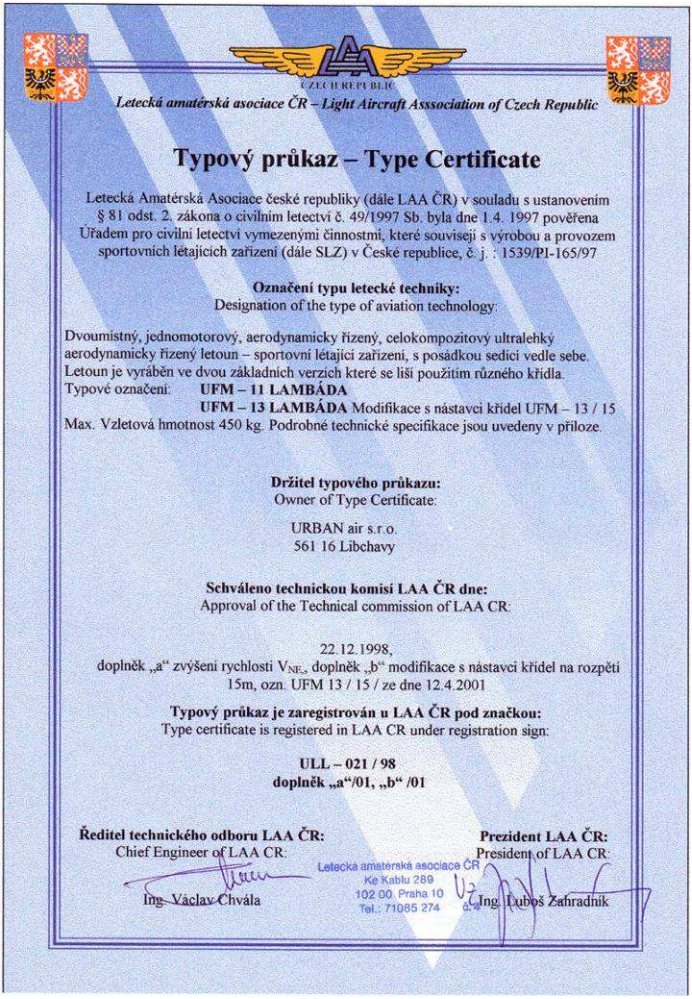
1.1 Introduction

This Flight Manual provides information useful for the safe and efficient operation of UFM - 13 ultralight aeroplane.

It also contains supplemental data supplied by the aeroplane manufacturer.

1.2 Certification basis

This type of aeroplane has been designed in compliance with „**Požadavky na letovou způsobilost Sportovních létajících zařízení Ultralehké letouny řízené aerodynamicky UL-2 část I** (Ultralight Airworthiness Requirements UL-2, part I)“, that is the valid Certification basis for the ULTRALIGHT category aeroplanes approved by the ***Czech Amateur Light Aircraft Association*** *(www.laacr.cz).*



CZECH REPUBLIC

Letecká amatérská asociace ČR – Light Aircraft Asssociation of Czech Republic

Typový průkaz – Type Certificate

Letecká Amatérská Asociace české republiky (dále LAA ČR) v souladu s ustanovením § 81 odst. 2. zákona o civilním letectví č. 49/1997 Sb. byla dne 1.4. 1997 pověřena Úřadem pro civilní letectví vymezenými činnostmi, které souvisejí s výrobou a provozem sportovních létajících zařízení (dále SLZ) v České republice, č. j. : 1539/PI-165/97

Označení typu letecké techniky:
Designation of the type of aviation technology:

Dvoumístný, jednomotorový, aerodynamicky řízený, celokompozitový ultralehký aerodynamicky řízený letoun – sportovní létající zařízení, s posádkou sedící vedle sebe. Letoun je vyráběn ve dvou základních verzích které se liší použitím různého křídla.
Typové označení: **UFM – 11 LAMBÁDA**
UFM – 13 LAMBÁDA Modifikace s nástavci křídel UFM – 13 / 15
Max. Vzletová hmotnost 450 kg. Podrobné technické specifikace jsou uvedeny v příloze.

Držitel typového průkazu:
Owner of Type Certificate:

URBAN air s.r.o.
561 16 Libchavy

Schváleno technickou komisí LAA ČR dne:
Approval of the Technical commission of LAA CR:

22.12.1998,
doplněk „a" zvýšení rychlosti V_{NE}, doplněk „b" modifikace s nástavci křídel na rozpětí 15m, ozn. UFM 13 / 15 / ze dne 12.4.2001

Typový průkaz je zaregistrován u LAA ČR pod značkou:
Type certificate is registered in LAA CR under registration sign:

ULL – 021 / 98
doplněk „a"/01, „b" /01

Ředitel technického odboru LAA ČR:
Chief Engineer of LAA CR:

Ing. Václav Chvála

Letecká amatérská asociace ČR
Ke Kablu 289
102 00 Praha 10
Tel.: 71085 274

Prezident LAA ČR:
President of LAA CR:

Ing. Luboš Zahradník

1.3 Warnings, cautions and notes

The following definitions apply to warnings, cautions and notes in the flight manual.

Warning

Means that the non-observation of the corresponding procedure leads to an immediate or important degradation of the flight safety.

Caution

Means that the non-observation of the corresponding procedure leads to a minor or to a more or less long term degradation of the flight safety.

Note

Draws the attention of any special item not directly related to safety but which is important or unusual.

1.4 Descriptive data

1.4.1 Aeroplane description

UFM - 13 ultralight aeroplane is intended for recreational and cross-country flying. It is not approved for aerobatic operation.

UFM - 13 is a single engine, all-fibreglass aeroplane with two side-by-side seats. The aeroplane is equipped with fixed two main wheel undercarriage with a steer able tail wheel. The fuselage is a fibreglass shell with fibreglass seats integrated. Safety belts are attached to the seats and to a shelf intended for putting off lightweight objects (headphones, maps, etc.).

The wing is a monospar construction with a sandwich skin composed of two layers of fibreglass and special foam. Control surfaces and empennage is of the same construction.

The aeroplane is controlled by dual push-pull control system, only rudder drive is controlled by cable. The ailerons and elevator are controlled by the control stick located between the pilot's legs (co-pilot's). The rudder is controlled by the rudder pedals, flaps are operated by a control lever located between the pilots on the fuselage main spar.

1.4.2 Basic Technical data

Wing

Span/span with wing extension 12.94/14.95m

Area/area with wing extension..... 12.16/12.87m^2

MAC ..... 0.987 m

Loading/loading area with wing extension..... 37/34.9kg/m^2

Flaperon

area..... 0.82 m^2

Fuselage

length ..... 6.6 m

width..... 1.08 m

height ..... 1.95 m

Horizontal tail unit

span ..... 2.5 m

area..... 1.3 m^2

elevator area ..... 0.45 m^2

Vertical tail unit

height ..... 1.2 m

area ..... 1.1 m^2

rudder area ..... 0.44 m^2

Landing gear

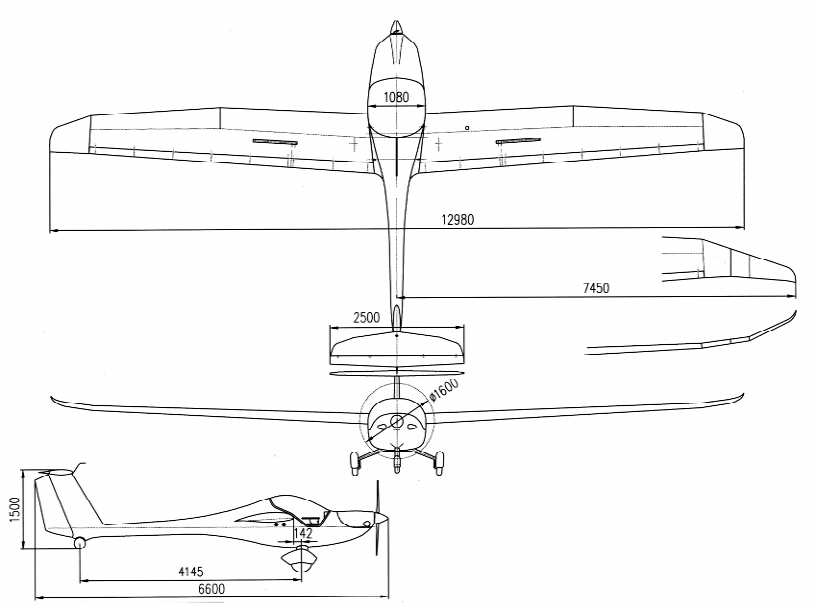
wheel track ..... 1.54 m

wheel base ..... 4.16 m

main wheel diameter ..... 0.4 m

tail wheel diameter ..... 0.2 m

1.5 Three-view drawing



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2.1 Introduction

Section 2 includes Operating limitations, instrument markings, and basic placards necessary for safe operation of the aeroplane, its engine, standard systems and standard equipment.

2.2 Airspeed

Airspeed limitations and their operational significance are shown below:

Airspeed		IAS [km/h]	Remarks
V_{NE}	Never exceed speed	200	Do not exceed this speed in any operation.
V_{NO}	Maximum structural cruising speed	145	Do not exceed this speed except in smooth air, and then only with caution.
V_A	Manoeuvring speed	135	Do not make full or abrupt control movement above this speed, because under certain conditions the air-craft may be overstressed by full control movement.
V_{FE}	Maximum Flap. Extension speed	110	Do not exceed this speed with flaps extended

2.3 Airspeed indicator markings

Airspeed indicator markings and their colour-code significance are shown below:

Marking	Range or value [IAS km/h]	Significance
White arc	70 - 110	Positive Flap Operating Range
Green arc	80 – 145	Normal Operating Range
Yellow arc	145 – 200	Manoeuvres must be conducted with caution and only in smooth air.
Red line	200	Maximum speed for all operations.

2.4 Powerplant

Engine Manufacturer : Bombardier-Rotax GMBH

Engine Model: Rotax 912 UL

Power:

Max. Take-off:	59,6 kW / 80 hp
Max. Continuous:	58 kW / 78 hp at 5500 rpm
Cruising:	53 kW / 71 hp at 4800 rpm

Engine RPM:

Max. Take-off:	5800 rpm, max. 5 min.
Max. Continuous:	5500 rpm
Cruising:	4800 rpm
Idling:	1400 rpm

Cylinder head temperature:

Minimum:	60 ℃
Maximum:	150 ℃

Oil temperature:

Minimum:	50 ℃
Maximum:	140 ℃
Opt. operating:	90 ℃ – 100 ℃

Fuel pressure (if the fuel gauge and sensor are installed):

Minimum:	0.40 bar
Maximum:	0.15 bar
Fuel:	see 2.13
Oil:	Automotive engine oil of registered brand with gear additives, but not aircraft oil (refer to engine Operator's Manual). API classification „SF" or „SG".
Propeller:	VARIA 160/2/R
Propeller diameter:	1600 mm

Warning

The Rotax 912 UL has not been certified as an aircraft engine and its failure may occur at any time. The pilot is fully responsible for consequences of such a failure.

2.5 Powerplant instrument markings

Function	Minimum Limit	Normal Operating Range	Caution Range	Maximum Range
Engine speed (RPM)	1400	1400-5500	5500-5800	5800
Cylinder Head Temperature (CHT) [°C]	60	60-100	100-150	150
Oil Temperature [°C]	50	90-110	110-140	140
Oil Pressure [bar]	1.5	1.5 – 4.0	4.0 – 5.0	7.0 cold engine starting

Note

In the TL engine instrument memory are stored the limits of 1st and 2nd level for Rotax 912 engine. The values of limits are stated in Operator's Manual for the TL engine instrument. A limit overrun is indicated by indicating lamp flashing and stored in the TL engine instrument memory for further evaluation. Make note of these limits and do not exceed them. If the limits are exceeded and a message „SERVICE" is shown on the TL engine instrument display - contact engine manufacturer or Rotax Service Centre for help.

2.6 Miscellaneous instrument markings

- Fuel gauge
  A fuel reserve of 7 litres is indicated by a yellow warning lamp.

2.7 Weight

Empty weight …… 307 kg

NOTE

Actual empty weight is stated in SECTION 6, par. 6.2

Max. take-off weight..... 520 kg

Max landing weight ..... 520 kg

Max. baggage weight..... 4 kg

2.8 Centre of gravity

Empty aeroplane C.G. position (standard) ... 32,0 %MAC

Operating C.G. range..... 20 - 35 %MAC

2.9 Approved manoeuvres

Aeroplane Category: NORMAL

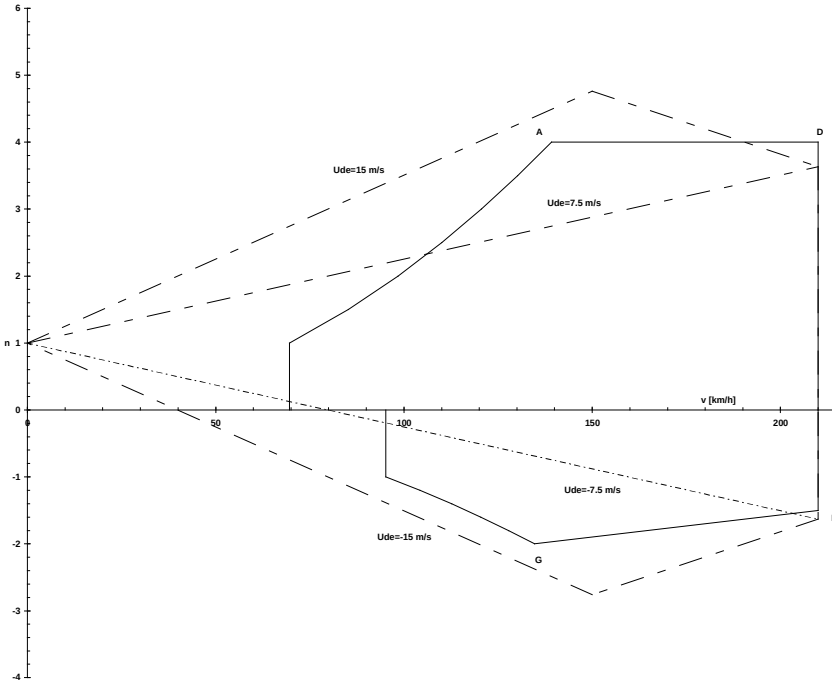
The aeroplane is approved for Normal and Manoeuvres listed below:

- Steep turn not exceeding 60° bank

Warning

Aerobatics, intentional spins and stalls are prohibited!

2.10 Manoeuvring load factors



2.11 Crew

Minimum crew..... 1

Maximum crew..... 2

2.12 Kinds of operation

Day VFR flights only.

Instruments and equipment for VFR flights:

1 Airspeed indicator (marked according to 2.3)

1 Altimeter

1 Vertical speed indicator

1 Magnetic compass

1 Bank indicator

2 Safety harnesses

2.13 Fuel

- automotive premium grade gasoline, leaded, according to DIN 516000,Ö-NORM C 1103
- EUROSUPER RON 95 unleaded accord. to DIN 51607,Ö-NORM 1100
- AVGAS 100 LL
- Due to higher lead content in AVGAS, the wear of valve seats and deposits in the combustion chamber will increase. Therefore, use AVGAS only if other fuel types are not available.
- BA 95 Natural is recommended for Czech Republic

For other suitable fuel types refer to the engine Operator's Manual.

2.14 Maximum passenger seating

Number of seat 2

Minimum crew weight ..... 65 kg

Maximum crew weight ..... see 6.2

Warning

Never exceed 520 kg Max. Take-Off Weight.

2.15 Other limitations

- No smoking aboard the aeroplane.

2.16 Limitation placards

Caution

The owner (aeroplane operating agency) of this aeroplane is responsible for placards readability during aeroplane service life.

UFM 13 **URBAN - AIR**

Empty weight	**307 kg**
Max. Take-off weight	**520 kg**
Min. crew weight	**65 kg**
Max. baggage weight	**4 kg**
Never exceed speed	**V_{NE} 200 km/h**
Stalling speed	**V_{so} 65 km/h**
Fuel tank capacity	**2 x 50 l**

Manufactured:	**URBAN – AIR s.r.o.**
Model:	**UFM 13**
Date of produce:	**2008**
S/N	**105/13**
Registration:	
Empty weight:	**307 kg**
Max. Take-Off Weight:	**520 kg**

Permitted crew weight

25 l in fuel tank	**148 kg**
50 l in fuel tank	**130 kg**
75 l in fuel tank	**112 kg**
full fuel tank	**94 kg**
half an hour flight	**157 kg**

Section 3

3. Emergency procedures

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3.1 Introduction

Section 3 provides checklist and amplified procedures for coping with emergencies that may occur.

Emergencies caused by aeroplane or engine malfunctions are extremely rare if proper pre-flight inspections and maintenance are practised.

However, should an emergency arise, the basic guidelines described in this section should be considered and applied as necessary to correct the problem.

For best glide ratio, speeds and performance please see section 5. performance.

3.2 Engine failure

3.2.1 Engine failure during take-off run

1. Throttle	- retard to idle
2. Ignition	- off

3.2.2 Engine failure immediately after take-off

1. Speed	- keep gliding speed at 100 km/h
	- sinking rate cca. 1,25 m/s
2. Altitude	- below 50 m: land in take-off direction
	- over 50 m: choose landing area
3. Wind	- evaluate direction and velocity
4. Landing area	- choose free area without obstacles, into wind
5. Flaperon	- extend as needed
6. Air brake	- extend as needed
7. Fuel valve	- off

8. Ignition	- off
9. Safety harness	- tighten
10. Master key	- switch off position before landing
11. Land	

Note

Skip 6-10 if necessary.

3.2.3 Engine failure in flight (Forced landing)

1. Speed	- keep gliding speed at 100 km/h
	- sinking rate cca. 1,25 m/s
2. Altitude	- below 50 m: land in take-off direction
	- over 50 m: choose landing area
3. Wind	- evaluate direction and velocity
4. Landing area	- choose free area without obstacles
5. Flaperon	- extend as needed
6. Air brake	- extend as needed
7. Fuel valve	- off
8. Ignition	- off
9. Safety harness	- tighten
10. Master switch	- off before landing
11. Land	

3.3 In-Flight start

1. Speed - keep speed a bit higher at 120 km/h
2. Altitude - check
3. Landing area - choose according to altitude (safest area)
4. Master switch - on
5. Fuel valve - open
6. Choke - as necessary (for cold engine)
7. Throttle - for 1/3 power
8. Ignition - on
9. Starter - turn switch box key

3.4 Smoke and fire

3.4.1 Fire on ground

1. Fuel valve - off
2. Throttle - full
3. Master switch - off
4. Ignition - off
5. Abandon the aeroplane
6. Extinguish fire if possible or call fire department.

3.4.2 Fire during take-off

1. Fuel valve - off
2. Throttle - full
3. Speed - 110 km/h
4. Master switch - off
5. Ignition - off
6. Land and brake
7. Abandon the aeroplane
8. Extinguish fire if possible or call fire department.

3.4.3 Fire in flight

1. Fuel valve - off
2. Throttle - full
3. Master switch - off
4. Ignition - off after using up fuel in carburettors and engine stopping
5. Choose of area - heading to the nearest airport or choose emergency landing area
6. Emerg. landing - perform according to par.3.6.1
7. Abandon the aeroplane
8. Extinguish fire if possible or call fire department.

3.5

Note

Estimated time to pump fuel out of carburettors is of 30 sec.

3.5. Glide

Gliding may be used in case of engine failure.

1. Speed	- ~ 100 km/h
2. Flaperon	- retracted
3. Instruments	- within permitted limits

3.6 Landing emergencies

3.6.1 Emergency landing

1. An emergency landing may be carried out due to engine failure and when the engine cannot be restarted.

2. Speed	- 100 km/h
3. Trim	- trim the aeroplane
4. Safety harness	- tighten
5. Flaperon	- extend as needed
6. Air brake	- extend as needed
7. COMM	- if installed - report your location if it is possible
8. Fuel valve	- off
9. Ignition	- off
10. Master switch	- off

3.6.2 Precautionary landing

A precautionary landing may be carried out due to low fuel and/or bad weather conditions.

1. Choose landing area, determine wind direction
2. If a COMM is installed - report your plan to land and land area location to nearest ATC
3. Perform low-altitude passage into wind over the right-hand side of the chosen area with flaps extended to the take-off position at a speed of 110 km/h to thoroughly inspect the area
4. Perform flight around the chosen area
5. Perform an approach at increased idling with fully extended flaps
6. Reduce power to idle when over the runway threshold and touch-down at the very beginning of the chosen area
7. After stopping the aeroplane switch off all switches, shut off the fuel valve, lock the aeroplane and look for a help

Note

Watch the chosen area continuously during precautionary landing.

3.6.3 Landing with a flat tire

1. Approach - Normal
2. Touch down - good tire first, keep the damaged wheel above ground as long as possible using ailerons
3. Maintain the direction at landing run, applying braking control

3.6.4 Landing with a defective landing gear

1. If the main landing gear is damaged, perform touch-down at the Lowest speed possible and maintain direction during landing run, if possible
2. If the tail wheel is damaged perform touch-down at the lowest possible speed and maintain direction during landing run, if possible.

3.7 Recovery from unintentional spin

Warning

Intentional spins are prohibited!

There is no tendency of spontaneous uncontrollable spin entry if normal pilot techniques are used.

Should an inadvertent spin occur, the following recovery procedure should be used:

1. Throttle	-	retard to idle
2. Control stick	-	hold ailerons neutralized
3. Rudder pedals	-	apply full opposite rudder
4. Control stick	-	forward elevator control as required to break the spin
5. Rudder pedals	-	immediately after the stopping of a rotation neutralise the rudder
6. Recover from dive		

3.8 Other emergencies

3.8.1 Vibration

If vibrations appear::

1. Set engine speed to power setting where the vibrations are the lowest.
2. Land at the nearest airfield or perform a precautionary landing according to 3.6.2

3.8.2 Carburettor icing

Carburettor icing mostly occurs when getting into an area of ice formation. The carburettor icing shows itself through a decrease in engine power and an increase of engine temperatures.

To recover the engine power, the following procedure is recommended:

1. Speed - 110 km/h
2. Throttle - set for 1/3 power
3. If possible, leave the icing area
4. Gradually increase the engine power to cruise conditions after 1-2 minutes.

If you fail to recover the engine power, land at the nearest airfield (if possible) or depending on circumstance, execute a precautionary landing according to 3.6.2

Section 4

4. Normal procedures

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4.1 Introduction

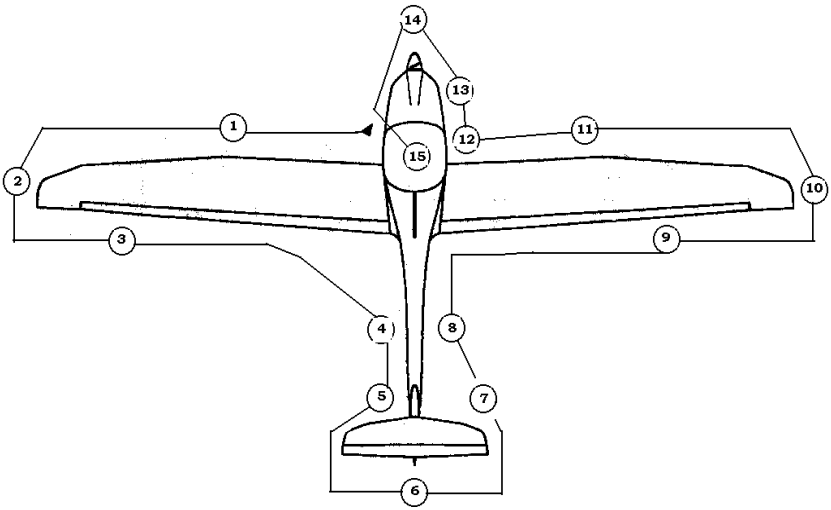
Section 4 provides checklist and amplified procedures for the conduct of normal operation.

4.2 Assembly and disassembly

Refer to 8.4.7 a 8.4.8 for assembly and disassembly procedures.

4.3 Pre-flight inspection

The pre-flight inspection is very important because an incomplete or careless inspection could allow aeroplane failure. The following pre-flight inspection procedure is recommended by the aeroplane Manufacturer:



⇒ Check if ignition is switched off in the cockpit

1. Wing
   - Wing surface condition
   - Leading edge condition
   - check if the flaperon controls are correctly shifted in the automatic gripping

2. Wing tips
   - Surface condition
   - Check of tips attachment
   - Condition and attachment of position lights (if installed)

3. Flaperon
   - Surface condition
   - Attachment
   - Play

4. Fuselage rear
   - Surface condition

5. Vertical tail unit
   - Surface condition
   - Play
   - Free movement
   - Pitot-tube inspection

6. Horizontal tail
    - Surface condition
    - Attachment
    - Play
    - Free movement
    - check if the elevator control is correctly shifted in the automatic gripping
7. see. 5
8. see. 4
9. see. 3
10. see. 2
11. see. 1
12. Landing gear
    - Check of main landing gear and tail wheel attachment
    - Tail wheel steering
    - Condition and inflation of tires
    - Condition and attachment of wheel fairings (if installed)

13. Motor

- Engine cowlings condition
- Engine mount condition
- Engine attachment check
- Oil quantity check (after 1 minute engine run)
- Cooling liquid quantity check
- Fuel and Electrical system visual check
- Fuel system drain

> Caution
>
> It is advisable to turn the propeller by hand **with ignition off** if the engine has been out of operation for a long time. Avoid excessive pressure on a blade tip and trailing edge.

14. Propeller

- Propeller attachment
- Blades, Hub, Spinner condition

15. Cockpit

- Ignition key - off
- Switch box - off
- Master switch - off
- Instruments - check of condition
- Fuel gauge - fuel quantity check (for fuel quantity check switch on Switch box and Master switch, then switch off!)

- Controls
  - visual check
  - check for proper function
  - check of plays
  - check of flaps extension
  - check of free movement up to the stops
- Check for loose items - secure papers
- Canopy - Condition of attachment, cleanliness

4.4 Normal procedures

4.4.1 Before entering cockpit

1. Aeroplane surface - check of covers and caps
2. Cockpit - items inside the cockpit
3. Ignition - off
4. Master switch - off

4.4.2 After entering cockpit

1. Rudder control - free movement check - Correct?
2. Brakes - check of function
3. Hand control - free movement check - Correct?
4. Trim - check control movement
5. Flaperon - check of function
6. Engine controls - throttle and choke lever movement
7. Fuel valve - off
8. Fuel gauge - fuel quantity check
9. Switch box - off
10. Circuit breakers - off
11. Ignition - off
12. Instruments, COMM- condition check
13. Safety harness - check of integrity and attachment
14. Cockpit - condition and canopy lock function

4.4.3 Before engine starting and Engine starting

1.	Fuel valve	- on
2.	Switch box	- turn the key
3.	Circuit breakers	- in
4.	Throttle	- set for idling
5.	Choke	- according to engine temperature
6.	Control stick	- fully pulled
7.	Check of free area	- clear
8.	Master switch	- on
9.	Ignition key	- on, start
10.	After starting	- set throttle to idling
11.	Oil pressure	- within 10 sec. min. pressure
12.	Choke	- off
13.	Engine warm	- according to 4.4.4

Caution

The starter should be activated for max.10 sec., then 2 min. pause for engine cooling.

After engine starting adjust the throttle for smooth running at 2500 rpm. Check oil pressure which should increase within 10 sec. Increase engine speed after oil pressure reaches2 bars and is steady.

To avoid shock loading start the engine with throttle lever set for idling or max. 10 % opened, then wait 3 sec to reach constant engine speed before accelerating.

Use ignition key for magneto check.

4.4.4 Engine warm up, Engine check

Lock the main wheels by means of wheel chocks before engine check. Refer to the Engine Manual for warming .

Set max. power.

Check acceleration from idling to max. power. If necessary cool the engine prior to its shutdown.

Caution

Engine check should be performed with the aeroplane pointing upwind and not on loose terrain (the propeller will pick up debris which can damage the propeller).

4.4.5 Taxiing

The maximum recommended taxiing speed is 15 km/h The direction of taxiing can be controlled by the steer able rear wheel – rudder. There is installed the lever on the control stick to operate the brakes. Keep control stick always fully pulled during taxiing.

4.4.6 Before take-off

1.	Brakes	- fully applied
2.	Rudder control	- check of free movement
3.	Hand control	- check of free movement
4.	Trim	- neutral position
5.	Flaperon	- "TAKE-OFF" position
6.	Engine controls	- choke off
7.	Fuel valve	- open
8.	Fuel gauge	- fuel quantity check
9.	Circuit breakers	- in
10.	Instruments, COMM,	- within limits, frequency set
11.	Safety harness	- secured and tightened
12.	Cockpit	- canopy condition, lock

4.4.7 Take-off

Gradually increase the throttle (max. power) to set the aeroplane into motion.

The direction of take-off run can be controlled by steerable tail wheel and rudder. Slightly push the stick to lift the tail wheel – maximum to the centre position. The aeroplane takes-off at a speed above 70 km/h, then slightly push forward the stick to reach climb speed of 110 km/h. Refer to the par. 5.2.5 for optimum climb speed. Max. flaps extended speed is 110 km/h.

Warning

The Take-off is prohibited if:

- The engine run is unsteady
- The engine instruments values are beyond operational limits
- The engine choke is on
- The crosswind velocity exceeds permitted limits. 5.3.3

4.4.8 Climb

1. Throttle - Max. Continuous Power
2. Speed - 110 km/h
3. Trim - adjust as needed to reduce stick pressure
4. Instruments - CHT, Oil temp. and pressure within limits.

> Caution
>
> If cylinder head or oil temperature exceed limits, reduce the angle of climb to increase airspeed and allow better cooling.

4.4.9 Cruise

The aeroplane flight characteristics are very forgiving within permitted limits of airspeeds, configurations and C/G range. The aeroplane can be controlled very easily. Refer to the Section 5 par. 5.3.1 .

4.4.10 Descent

1.	Throttle	- idling
2.	Speed	- 110 km/h
3.	Trim	- as necessary to reduce stick pressure
4.	Instruments	- within limits

> Caution
>
> When on long final or descending from a very high altitude, it is not advisable to reduce the engine Throttle control lever to idle. The engine becomes overcooled and a loss of power occurs. When descending, apply increased idle so that engine instrument readings stay within the limits for normal use.

4.4.11 Check before landing

1.	Fuel	- fuel quantity check
2.	Safety harness	- tightened
3.	Brakes	- check function
4.	Trim	- adjust as required
5.	Landing area check	- runway
		- Base leg

4.4.12 On base leg

1. Speed - 110 km/h
2. Flaperon - extend to "TAKE-OFF“ position
3. Trim - adjust as required
4. Throttle - as necessary
5. Instruments - within limits

4.4.13 On final

1. Speed - 110 km/h
2. Flaperon - "LANDING“ position
3. Trim - adjust as required
4. Throttle - as necessary
5. Instruments - within limits

4.4.14 Landing

The airspeed during final is slowly reduced, so that the touch down speed is about 70 km/h.

Gradually pull the stick after touch down. The landing run can be shortened by braking.

Caution
When the airplane rebounds hold the control stick fully pulled.

4.4.15 Balked landing

1.	Throttle	- full
2.	Engine speed	- 5200 rpm
3.	Flaperon	- set at the "TAKE-OFF" position at a speed of 110 km/h
4.	Trim	- as necessary
5.	Flaperon	- retract at a height of 50 m
6.	Trim	- as necessary
7.	Engine speed	- Max. cont. power
8.	Instruments	- within limits
9.	Climb	- at 120 km/h

4.4.16 After landing

1.	Engine speed	- set as necessary for taxiing
2.	Flaps	- retracted and locked
3.	Trim	- neutral position

4.4.17 Engine shutdown

1. Engine speed - idling
2. Instruments - engine instruments within limits
3. COMM + intercom - off
4. Ignition key - off
5. Circuit breakers - off
6. Master switch - off
7. Fuel valve - off

4.4.18 Flight in rain

When flying in the rain, no additional steps are required. Aeroplane qualities and performance are not substantially changed.

4.4.19 Feathering of the propeller

1 Shut off engine with ignition key (off position)

2 After the engine stops, turn propeller control lever to rear position

4.4.20 Engine restarting

1Turn the propeller control lever forward into the operating position.

Move the lever slowly!

2 Start with ignition key

Caution

After the engine off, the engine could be cooled down. Use the choke in this case

Note

Whit the feathered propeller is disconnected the engine starter circuit. It is impossible to start the engine.

Section 5

5. Performance

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5.2.2 Stall speeds....5-3
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5.3.3 Demonstrated crosswind performance....5-7

5.1 Introduction

Section 5 provides approved data for airspeed calibration, stall speeds and take-off performance and additional information.

The data in the charts has been computed from actual flight tests with the aeroplane and engine in good condition and using average piloting techniques.

If not stated otherwise the performance data given in this section is valid for max. takeoff weight and under International Standard Atmosphere (ISA) conditions.

5.2 Performance

5.2.1 Airspeed indicator system calibration

V IAS [km/h]	δV [km/h]	V CAS [km/h]
70	-5	65
80	-3	77
90	-2	88
100	-1	99
110	0	110
120	1	121
130	2	132
140	3	143
150	4	154
160	5	165
170	6	176
180	7	187
190	9	199
200	10	210
215	13	228

5.2.2 Stall speeds

Stall	Flaps position	Engine Power	Warning speed		Stalling Speed	
			IAS [km/h]	CAS [km/h]	IAS [km/h]	CAS [km/h]
Wing level stall	RETRACTED	idling	85	82	80	77
	"TAKE-OFF“	idling	75	70	70	65
	"LANDING“	idling	75	70	70	65

Note

When the stall develops the aeroplane moves downward without pitching, is fully controllable and level flight may be recovered without excessive loss of altitude.

5.2.3 Take-off performance

Take-off distances stated in the following table are valid at sea level and for MTOW.

	Take-off run distance [m]	Take-off distance over 15 m obstacle [m]
Grass	150	275

5.2.4 Landing

Landing distances stated in the following table are valid at sea level and for MTOW.

	Landing distance over 15 m obstacle [m]	Landing run distance (full braking) [m]
Grass	285	80

5.2.5 Climb performance

Best Rate-of-climb speed is 110 km/h IAS, corresponding Rate of climb is 5 m/s.

5.3 Additional information

5.3.1 Cruise

Regime	Economy Cruise	Max. Continuous Power	Max. Take-Off Power
Time limitation	unlimited	unlimited	max. 5 min.
Engine speed	4500	5500	5800
Altitude [m ISA]	IAS [km/h]	IAS [km/h]	IAS [km/h]
	130	160	190

5.3.2 Endurance

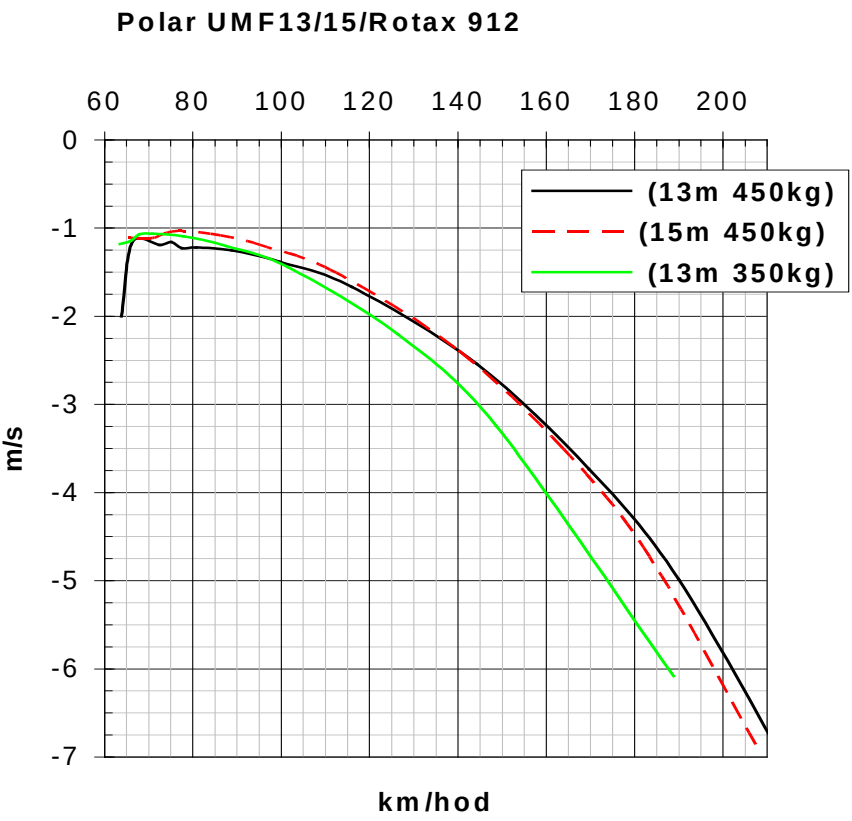
In the following table are stated fuel consumptions, endurances and ranges for RPM settings of UFM – 13 ultralight aeroplane.

Regime		Max. Continuous Power	Economy Cruise
Engine speed	**[rpm]**	5500	4500
Airspeed	**IAS [km/h]**	160	130
	CAS [km/h]	165	132
Fuel consumption	**[l/h]**	20	9.5
Range	**[km]**	825	1390

5.3.3 Demonstrated crosswind performance

Max. permitted cross wind velocity for take-off and landing	5	m/s
Max. permitted head wind velocity for take-off and landing	12	m/s

5.3.4 Speed polar



Section 6

6. Weight and Balance

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6.2 Permitted payload range.....6-2

6.1 Introduction

This sections contains the payload range within which the UFM-13 aeroplane may be safely operated.

Procedures for weighing the aeroplane and the calculation method for establishing the permitted payload range are contained in the Technical Description, Operating, Maintenance and Repair Manual for UFM – 13 ultralight aeroplane.

6.2 Permitted payload range

Empty weight of airplane is 306 kg.

Permitted crew weight	
25 l in fuel tank	148 kg
50 l in fuel tank	130 kg
75 l in fuel tank	112 kg
full fuel tank	94 kg
half an hour flight	157 kg

7. Aeroplane and Systems Description

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7.1 Introduction

This section provides description and operation of the aeroplane and its system.

Refer to Section 9, Supplements, for details of optional systems and equipment.

7.2 Airframe

UFM – 13 airframe is all-fibreglass monocoque construction.

7.2.1 Fuselage

All-fibreglass monocoque construction with integrated seats. There are stiffening ribs inside the fuselage rear and the fin reinforced with foam.

7.2.2 Wing

The fibreglass wing has one main spar with carbon flanges, no ribs; the stressed skin is of sandwich construction with a foam core.

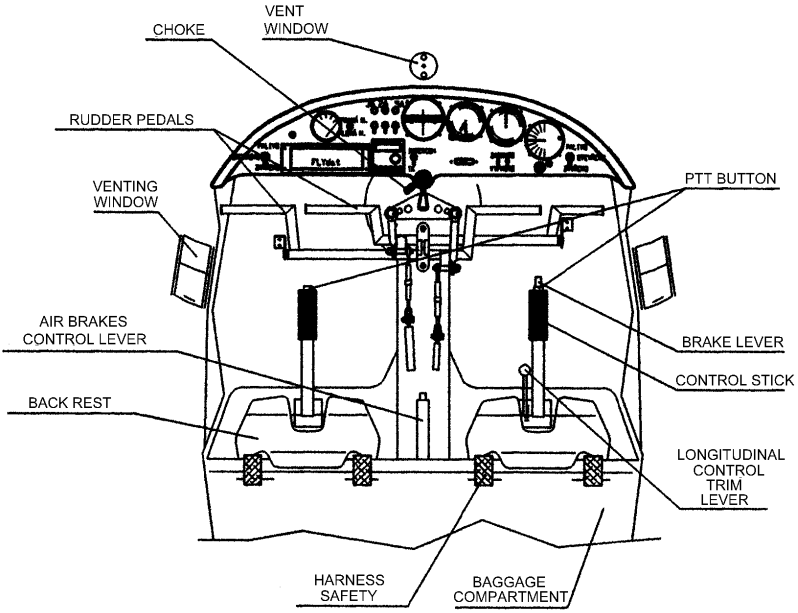
7.2.3 Horizontal Tail Unit (HTU)

HTU is of the same construction as the wing, only the spar is formed by a fibreglass profile.

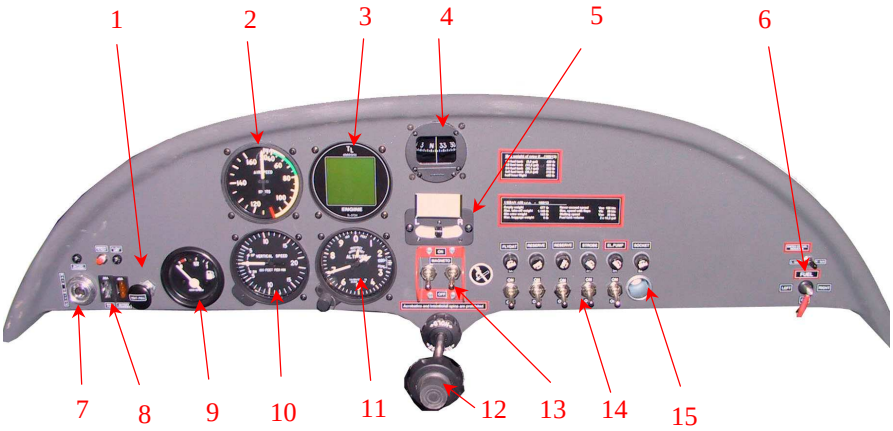
7.2.4 Vertical tail unit (VTU)

VTU is of sandwich construction and without a spar.

7.3 Controls in the cockpit



7.4 Instrument panel



1	Heating	**10**	Vertical speed indicator
2	Air speed indicator	**11**	Altimeter
3	TL-engine instrument	**12**	Throttle
4	Compass	**13**	Magnetos
5	Slip ball	**14**	Switches and fuses
6	Fuel tank valve and switch	**15**	12 V socket
7	Main key		
8	Main fuses		
9	Fuel indicator		

7.5 Landing gear

The plane has a two wheel main landing with a tail wheel. The main fibreglass legs, main wheel size 400 x 100, hydraulically operated brakes. The steer able tail wheel of 200 x 60 size is controlled by the rudder pedals.

Recommended pressure:

- main wheels **2,0 + 0,1 atm (bar)**
- tail wheel **1,6 + 0,1 atm (bar)**

7.6 Seats and Safety harness

The seats are an integral part of the fuselage. Back rests are formed by a fibreglass skeleton covered with upholstery. Four points safety harness with a central lock.

7.7 Baggage compartment

The shelf intended for putting off lightweight objects (headphones, maps, etc.) is located behind the heads of pilots.

7.8 Canopy

Canopy is made from the clear Plexiglas. The canopy frame is formed by a fibreglass profile. The canopy is tilted backward and it is locked in the closed position by three locks.

7.9 Engine

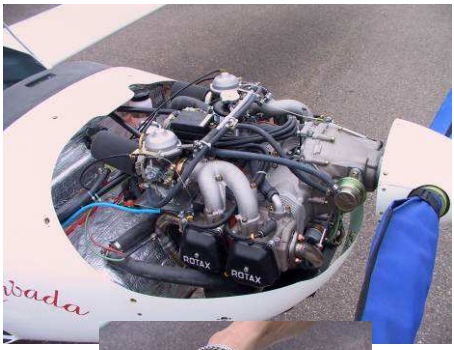
There is installed Rotax 912 UL engine in the UFM – 13 aeroplane.

Rotax 912 is 4-stroke, 4 cylinder horizontally opposed, spark ignition engine, one central camshaft-push-rods-OHV.

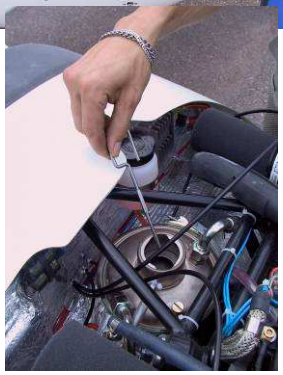
Liquid cooled cylinder heads, ram air cooled cylinders.

Dry sump forced lubrication.

Dual breaker less capacitor discharge ignition. The engine is fitted with electric starter, AC generator and mechanical fuel pump. Prop drive via reduction gear with integrated shock absorber.



Oil quantity check



Coolant quantity check

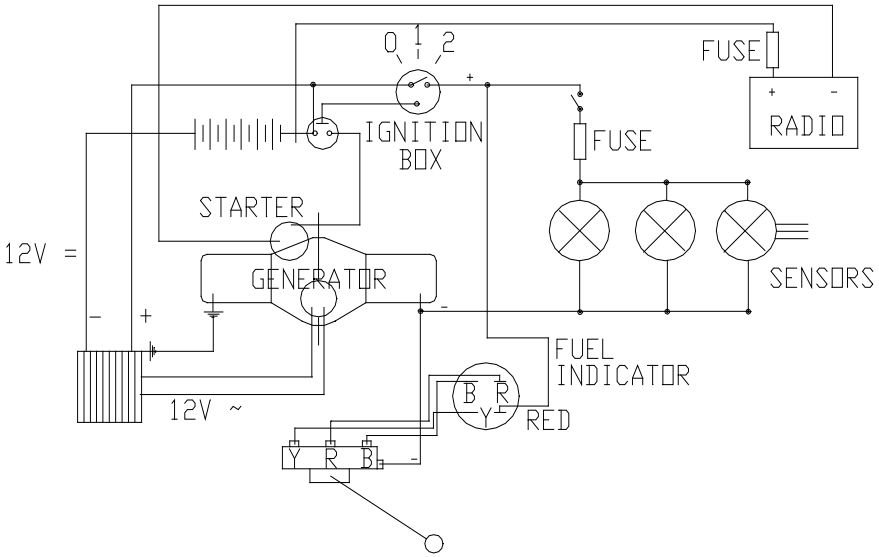
On-ground adjustable, 2 blade, composite propeller VARIA is attached to the propeller flange by means of 6 bolts, and covered with a conic spinner.

7.10 Fuel system

The 100 litre main fuel tanks are an integral part of the wings, a fuel quantity sensors are located inside the wings. Further a coarse filter, fuel valve, and fine filter are parts of the fuel system.

For draining use blow down valve located on the bottom of the wing.

7.11 Electrical system



7.12 Pitot-static system

The pitotstatic system consists of a pitot tube on the fin and static ports located on the fuselage sides c. 1m behind the wing trailing edge. Pressure distribution to individual instruments is done through flexible plastic hoses.

Keep the system clear to assure its correct function. If water gets inside the system disconnect hoses from the instruments and slightly blow into the system.

Cover or remove pitot tube during transport.

7.13 Miscellaneous equipment

Besides the standard instruments the UFM – 13 aeroplane is equipped with following miscellaneous equipment:

- Ballistic rescue system GALAXY
- Cockpit heating

7.14 Avionics

- Flight instruments :
  - Airspeed indicator
  - Altimeter
  - Compass
  - Vertical speed indicator
  - Slip ball
- Engine instruments :

The integrated engine instrument TL-engine instrument provides all engine information.

- Engine rpm
- Engine hours
- Exhaust gases temperature
- Cylinder head temperature
- Oil temperature
- Oil pressure
- Overrun of data limits

Refer to the TL-engine instrument Operator's Manual for more details.

The UFM – 13 aeroplane is additionally equipped with electric Fuel Indicator.

Section 8

8. Aeroplane handling, servicing and maintenance

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8.1 Introduction

This section contains factory-recommended procedures for proper ground handling and servicing of the aeroplane.

It also identifies certain inspection and maintenance requirements which must be followed if the aeroplane is to retain that new-plane performance and dependability.

It is wise to follow a planned schedule of lubrication and preventive maintenance based on climatic and flying conditions encountered.

8.2 Aeroplane inspection periods`

Periods of overall checks and contingent maintenance depends on the condition of the operation and on overall condition of the aeroplane. The producer recommends to accomplish maintenance checks and periodic inspections in the following periods, at least:

After each year of operation clean and lubricate the bearings per Lubricating Chart. Contact the Aeroplane Manufacturer when plays are excessive.

Refer to the Engine Operator's Manual for maintenance.

The propeller is maintained according to its condition. The inspection performed by the propeller manufacturer is highly recommended after 100 hours of operation.

Refer to the Operating, Maintenance and Repair Manual for UFM – 13 aeroplane for more details about periodical inspections.

8.3 Aeroplane alterations or repairs

It is essential that the aeroplane manufacturer be contacted prior to any alternations on the aeroplane to ensure that airworthiness of the aeroplane is not compromised.

If the aeroplane weight is affected by an alternation, a new weight and balance will be necessary. A revised "Weight and Balance Record / Permitted payload range" and Placard "LOAD LIMITS" must be filled out and attached to the aeroplane.

Refer to the Operating, Maintenance and Repair Manual for UFM – 13 aeroplane for repairs.

8.4 Ground handling / Road transport

8.4.1 Towing

It is easy to tow the aeroplane a short distance by holding the blade root because the empty weight of this aeroplane is relatively low.

Suitable surfaces to hold the aeroplane airframe are the rear part of the fuselage before the fin and wing roots..

> Caution
>
> Avoid excessive pressure at the aeroplane airframe - especially at the wing tips, elevator, rudder, trim etc.

> Caution
>
> Handle the propeller by holding the blade root - never the blade tip! If starting the engine manually - always handle the propeller on a blade surface i.e. do not hold only an edge

8.4.2 Parking

It is advisable to park the aeroplane inside a hangar or eventually inside other weather proof space (such as a garage) with a stable temperature, good ventilation, low humidity and dust-free environment.

It is necessary to tie-down the aeroplane when parking outside.

When the plane must be tied-down outdoors for extended periods, it is advisable to cover the cockpit canopy, and if possible, the entire aeroplane using a suitable cover.

8.4.3 Teeing-Down

The aeroplane is usually tied-down after a flight day or when needed. The teeing-down is necessary to protect the aeroplane against possible damage caused by wind gusts.

For reason the aeroplane is equipped with tie-down strips on the wing tips.

Procedure: :

- Check: Fuel valve off, Circuit breakers and Master switch off, Switch box off.
- Block the control stick up e.g. by means of safety harness
- Close and lock cockpit
- Shut all the ventilation windows
- Tie-down the aeroplane to the ground by means of the strips. It is also necessary to tie-down the fuselage rear and nose wheel landing gear (lace a rope through the wheel and fork).

Note

It is advisable to cover cockpit canopy, if possible the whole aeroplane, by means of a suitable covering material attached to the airframe for long term outside parking.

8.4.4 Jacking

Because the empty weight of this aeroplane is relatively low it is easy to lift the aeroplane using 2 persons.

First prepare two suitable jacks to support the aeroplane.

The aeroplane should be lifted by the following parts:

- Press-down on the rear of the fuselage in front of the fin to lift the front and then support under the firewall.
- To jack the rear of the fuselage grab the fuselage near the auxiliary tail skid, lift it upward and support.
- To lift the wings, push on the wings lower surface at the main spar. Do not lift by the wing tips.

8.4.5 Levelling

Refer to the Operating, Maintenance and Repair Manual for UFM-13 ultralight aeroplane for more details about levelling.

8.4.6 Road transport

The aeroplane may be transported in a suitable trailer. It is necessary to dismantle aeroplane before loading.

8.4.7 Aeroplane Assembly

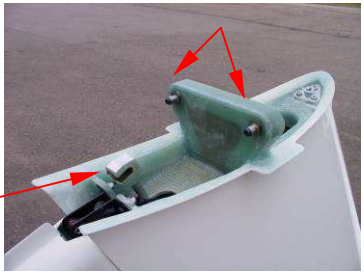
Note

No special qualification needed for assembling/disassembling.

Degrease and clean all connecting parts and grease again using suitable lubricants.

- ***Horizontal Tail Unit (HTU) Installation:***

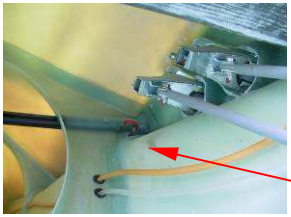
Set the HTU on the two main pins and at the same time insert the elevator control bell into automatic gripping.



Then screw the front screw and secure with safety pin.

- ***Wing Installation:***

Set the left half of the wing on the pins and check automatic connection of control rods.

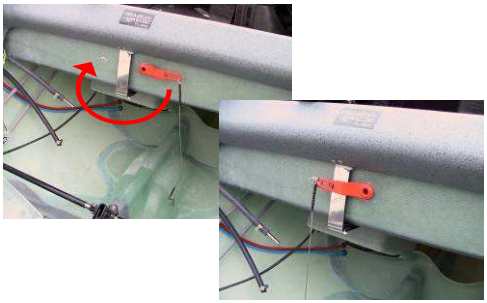


Then secure the rear auxiliary pin.

Follow with the right half of the wing, insert the wing in automatic connection device and secure the rear auxiliary pin.

Connect fuel sensor and fuel hose from left and right fuel tank.

Insert the main eccentric pin, turn it 180 ° to tig hten both halves of the wing together.



Then secure the main pin with a clip through the spar end and at the rear with a safety pin.

Don’t forget to secure the main eccentric pin with wire.

Check control system and fuel gauge function. Use an adhesive tape to cover the gap between the centre section and the wing root.

8.4.8 Aeroplane Disassembly

Follow the Assembly steps in reverse order.

8.5 Cleaning and care

Use cleaning detergents to clean aeroplane surface. Oil spots on aeroplane surface (except the canopy!) may be cleaned with appropriate degreasers.

The canopy clean should be cleaned only by washing it with lukewarm water and mild detergents, using clean, soft cloth sponge or deerskin. Then use suitable polishers to clean the canopy.

Caution
Never clean the canopy under "dry" conditions (it will scratch) and never use gasoline or chemical solvents!

Upholstery and covers may be removed from the cockpit, brushed or washed in lukewarm water with mild detergents. Dry the upholstery before reinstalling inside the cockpit.

Caution
For long term storage cover the canopy to protect the cockpit interior from the direct sunshine..

Section 9

9. Supplements

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9.2 List of inserted supplements 9-1
9.3 Supplements inserted.....9-2

9.1 Introduction

This section contains the appropriate supplements necessary to safely and efficiently operate the aeroplane when equipped with various optional systems and equipment not provided with the standard aeroplane.

9.2 List of inserted supplements

Date	Title of inserted supplement

9.3 Supplements inserted

9.4 Service records

9.4.1 Summary of repairs, checking, parts changes etc.

Operation: (reason)	date	hours flown	sign: done by… controlled by…

Operation: (reason)	date	hours flown	sign: done by… controlled by…

9.4.2 Bulletin of producer

Serial number	bulletin number	date	remarks	sign: done by… controlled by…